Devi Ahilya University, Indore, India Institute of Engineering & Technology				IV Year B.E. (Electronics & Instrumentation Engg.)			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
EIR8C2	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
EMBEDDED SYSTEM	**3**	**1**	**0**	**3**	**1**	**0**	**4**
Duration of Theory Paper: 3 Hours							

Learning Objective:

- The goal of the course is to teach the concepts C Language and object oriented programming, PIC architecture and peripheral interfacing.
- To read and understand the C and C++ programming, PIC microcontroller architecture and programming and RTOS.
- The course focuses on how to write program and peripheral interfacing of PIC microcontroller and develop the applications.

Prerequisite: Knowledge of C language, Computer architecture and Microcontroller.

COURSE CONTENTS

UNIT I -Introduction to Embedded systems: Embedded systems, processor embedded into a system, embedded hardware units and devices in a system, embedded software in a system, examples of embedded systems, embedded SOC and use of VLSI circuit design technology, Complex systems design and processors, Design process in embedded system, formalization of system design, design process and design examples, classification of embedded systems, skills required for an embedded system designer.

UNIT II- Microcontrollers: PIC 16 Series family overview, an architecture overview of the 16F84A, Status register, 16F84A memory, Some issues of timing, Power-up and Reset, PIC 16F84A parallel ports, 16F84A clock oscillator, 16F84A operating conditions, 16F84A interrupt structure.

UNIT III-Larger systems and the PIC 16F873A:The main idea –the PIC 16F87XA, The 16F873A block diagram and CPU, 16F873A memory and memory maps, 16F873A interrupts, 16F873A oscillator, reset and power supply, 16F873A parallel ports.

UNIT IV-RTOS: Basic design using RTOS, Micro/OS-II and Vxworks, windows CE, OSEK, real-time Linux functions,

UNIT V- Case study: Digital camera hardware and software architecture, embedded systems in automobile, embedded system for a smart card, mobile phone software for key inputs.

Learning Outcome:

After learning the course the students should be able to

- Understand the fundamentals of embedded systems
- Understanding of C and basics of C Understand the OOP concepts of classes, objects, methods,
- constructors, destructors in C++
- Understand the microcontroller architecture (PIC)
- Understand and able to write the assemble language program.
- Understand and able to write the I/O and timers/counter programming

BOOKS RECOMMENDED:

[1]. Embedded Systems Architecture Programming and Design by Raj Kamal, II edition, Tata MCGraw-Hill.
[2]. Designing Embedded Systems with PIC Microcontroller s: principles and applications by Tim Wilmshurst, Elsevier.
[3]. Embedded Systems Design by Steve Heath, II edition, Newnes publications
[4]. Embedded Systems Architecture: A Comprehensive Guide for Engineers and
[5]. Programmers by Tammy Noergaard, Elsevier